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**PRE-APPEAL BRIEF REQUEST FOR REVIEW**Docket Number (Optional)  
12406-0083001

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Typed or printed  
name \_\_\_\_\_Application Number  
10/798,712Filed  
March 10, 2004First Named Inventor  
Karsten HeuserArt Unit  
1712Examiner  
Robert A. Vetere

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.☐ assignee of record of the entire interest.  
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.  
(Form PTO/SB/96)☒ attorney or agent of record.Registration number 61,400☐ attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34 \_\_\_\_\_



Signature

John Paul Mello

Typed or printed name

(617) 542-5070

Telephone number

June 10, 2011

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.  
Submit multiple forms if more than one signature is required, see below\*.☐ \*Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Heuser et al.  
Serial No. : 10/798,712  
Filed : March 10, 2004

Art Unit : 1712  
Examiner : Robert A. Vetere  
Conf. No. : 5002

Title : METHOD FOR FORMING AN ARRANGEMENT OF BARRIER LAYERS ON  
A POLYMERIC SUBSTRATE

**MAIL STOP AF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REVIEW REQUEST REMARKS

Claims 1-31 were pending, with claims 4, 5, 8, 9, and 16 withdrawn from consideration.  
Claims 1-3, 6, 7, 10-15, and 17-31 are presented for pre-appeal brief review.

Claims 1-3, 6, 7, 10-15, 17-31 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Pub. No. 2003/0203210 ("Graff '210") or under 35 U.S.C. §103(a) as unpatentable over Graff '210 in light of U.S. 6,522,067 ("Graff '067) or in light of JP 2001-277420 ("Komada").

Claim 1 is the only independent claim and recites a method including:

modifying at least a portion of [a] second surface of [a] first ceramic barrier layer such that the second surface of the first ceramic barrier layer comprises a material different from the first material of the first ceramic barrier layer below the second surface to introduce first nucleation sites on the second surface, and forming a second ceramic barrier layer directly on the second surface of the first ceramic barrier layer without continuing all defects of the first ceramic barrier layer, wherein the second ceramic barrier layer is initiated at the first nucleation sites . . .

**Forming a Second Ceramic Barrier Layer Directly on a First Ceramic Barrier Layer**

Graff '210 has not been shown to have described "forming a second ceramic barrier layer directly on [a] second surface of [a] first ceramic barrier layer . . .," as recited in claim 1. Rather, Graff '210 has been shown to have described alternating polymer and inorganic layers.

Graff '210 described a mutli-layer environmental barrier coating 10 including a flexible substrate 12, a foundation stack 20, at least one barrier stack 30, and a topmost isolation layer.<sup>1</sup> "[T]he foundation stack 20 includes (or consists of) a foundation barrier layer 22 deposited onto

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<sup>1</sup> See, e.g., Graff '210, ¶[0040].

the flexible substrate 12 and an organic layer 24 deposited over the foundation barrier layer 22.”<sup>2</sup> One or more barrier stacks 30 are deposited over the foundation stack 20.<sup>3</sup> “Each barrier stack 30 includes (or consists of) a barrier-stack barrier layer 32 and an organic layer 34.”<sup>4</sup>

Graff ‘210 did not describe or make obvious applying a second barrier layer directly on a modified second surface of a first barrier layer, as recited in claim 1. FIG. 2 of Graf ‘210 shows a method of fabricating a multi-layer environmental barrier coating 10 including deposition of an organic layer between each barrier layer.<sup>5</sup> FIGS. 4A-B show specific methods of implementing the method of FIG. 2 using a particular apparatus.<sup>6</sup> Accordingly, the cited portion of Graf ‘210 related to FIG. 4A also described an organic layer deposited between each inorganic layer.<sup>7</sup> Thus, contrary to the assertion in the Office Action,<sup>8</sup> the cited portion of Graf ‘210 related to FIG. 4A, does not describe forming a second ceramic barrier layer directly on a first ceramic barrier layer.

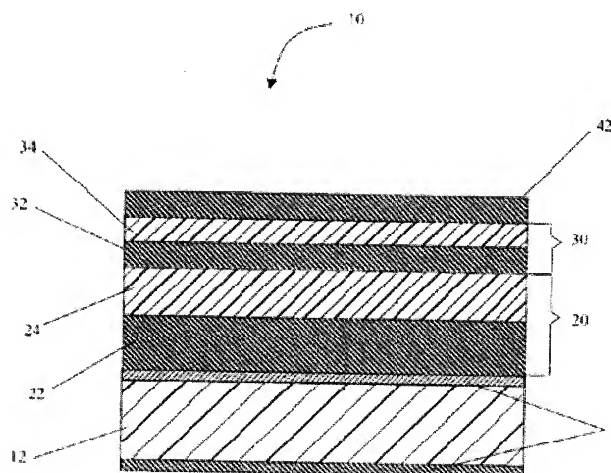


FIG. 1A

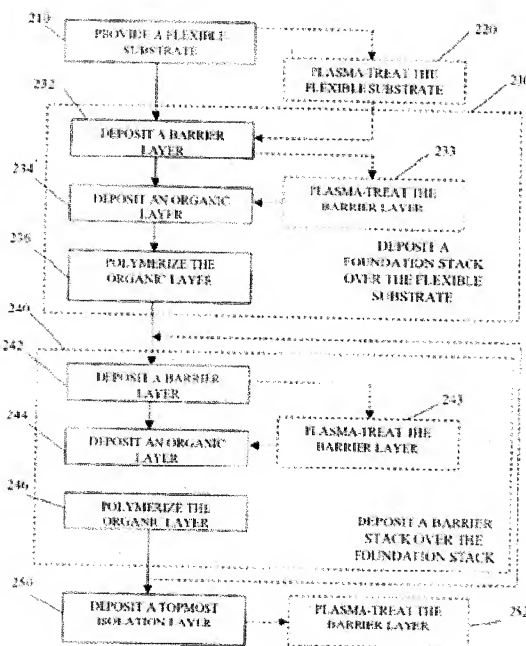


FIG. 2

<sup>2</sup> *Id.*, ¶[0042].

<sup>3</sup> *See e.g., id.*, ¶[0042].

<sup>4</sup> *Id.*

<sup>5</sup> *Id.* at FIG. 2.

<sup>6</sup> *Id.* at FIGS. 4A and 4B; *see also id.* at ¶¶[0065], [0085], [0088], [0092].

<sup>7</sup> *See, e.g., id.*, ¶¶[0088]-[0089]; *see also* Office Action of March 10, 2011 at 3-4 (citing Graff ‘210 at ¶[0088]).

<sup>8</sup> Office Action of March 10, 2011 at 3-4.

In the Response to Arguments, the Office Action takes the position that Graff '210 teaches a fourth inorganic layer deposited directly onto a third inorganic layer without an intervening organic layer and, thus, teaches a second ceramic barrier layer directly formed on a first ceramic barrier layer, as recited in claim 1.<sup>9</sup> However, the cited portion of Graff '210 described "a multi-layer environmental barrier coating having a plurality of alternating polymer and inorganic layers deposited over [a] flexible substrate, where the layer[s] immediately adjacent to the substrate and the topmost layer are inorganic . . ."<sup>10</sup> Also, the cited portion of Graff '210 described that the "multi-layer environmental barrier coating also includes a topmost isolation layer of a third inorganic material deposited over the barrier stack."<sup>11</sup> Although Graff '210 described that the barrier-stack layer "may also include at least one ply of a plasma-treated fourth inorganic material," deposition of the fourth inorganic material directly on the third inorganic material would have resulted in polymer and inorganic layers that do not alternate as described by Graff '210. Similarly, if the fourth inorganic material were deposited directly on the third inorganic material, the third inorganic material would no longer be the topmost layer as described by Graff '210.

Moreover, other portions of Graff '210 describe the fourth inorganic as not being directly deposited on the third inorganic material. For example, claims 37-38 of Graff '210 described a second ply of a fourth inorganic material deposited over a first ply of a second inorganic material, which is deposited over a foundation stack.<sup>12</sup> According to steps (c) and (d) of claim 34 of Graff '210, from which claims 37-38 depend, at least one barrier-stack organic layer is deposited over the first and second plies and below the topmost isolation layer, which comprises at least one ply of a third inorganic material.<sup>13</sup> For at least this reason, claims 34 and 37-38 of Graff '210 describe that the third inorganic material is not deposited in direct contact with the fourth inorganic material.

None of Graff '067 or Komada is asserted to remedy these deficiencies. For at least these reasons, claims 1-3, 6, 7, 10-15, 17-31 are patentable over the cited art.

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<sup>9</sup> See, e.g., *id.* at 2 (citing Graff '210 at ¶¶[0016]-[0018]).

<sup>10</sup> Graff '210 at ¶[0016].

<sup>11</sup> *Id.* at ¶[0017].

<sup>12</sup> See, e.g., *id.* at 11.

<sup>13</sup> See, e.g., *id.*

**Modifying at Least a Portion of a Second Surface of a First Ceramic Barrier Layer**

Graff '210 has not been shown to have described or made obvious a method for forming arrangement of two barrier layers on a substrate including "modifying at least a portion of [a] second surface of [a] first ceramic barrier layer such that the second surface of the first ceramic barrier layer comprises a material different from the first material of the first ceramic barrier layer below the second surface to introduce first nucleation sites on the second surface . . .," as recited in claim 1. Rather, Graff '210 has been shown only to have described plasma treatment of a polymeric material and plasma treatment of a barrier layer to remove contaminants.

The Office Action asserts that Graff '210 described modifying a portion of a second surface of a first ceramic barrier layer to introduce first nucleation sites on the second surface via plasma treatment.<sup>14</sup> However, in one embodiment cited in purported support of this assertion, Graff '210 described plasma treatment of a flexible substrate 12, which is formed of a polymeric material.<sup>15</sup> A person of ordinary skill in the art would not have understood plasma treatment of polymeric material to have described plasma treatment for changing the material on the surface of a ceramic barrier material to a material different from the material of the first ceramic layer. Moreover, in another embodiment cited in purported support of this assertion, Graff '210 described plasma treating a barrier layer 22 to remove contaminants to dehydrate the surface.<sup>16</sup> A person of ordinary skill in the art would have understood this to have described plasma treatment to clean water from the surface of the barrier layer 22 or to modify the surface area and density of the treated surface. For at least this reason, such plasma treatment did not describe or make obvious changing the material on the surface of a ceramic barrier layer to a material different from the material of the first ceramic layer.

Since neither of these cited embodiments described the use of plasma treatment to modify at least a portion of a second surface of a first ceramic barrier layer in the recited in claim 1, the Office Action further asserts that "Graff also explains that the plasma treatment causes the surface of the barrier layer to undergo structural and chemical modifications which improve

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<sup>14</sup> See, e.g., Office Action of March 10, 2011 at 4 (citing Graff '210 at ¶¶[0065], [0073]).

<sup>15</sup> See, e.g., Graff '210 at ¶[0065].

<sup>16</sup> See, e.g., *id.* at ¶[0073].

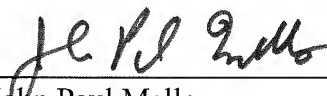
surface conditions for subsequent deposition. . .<sup>17</sup> However, this cited portion of Graff '210 described only that plasma treatment of barrier layers may reduce the amount of contaminants on the barrier layers and may also modify the surface tension of the barrier layers through removal or agitation of the surface molecules.<sup>18</sup> Thus, to the extent this cited portion of Graff '210 described that the barrier layers may undergo chemical modifications, this description does not relate to all types of chemical modifications, as the Office Action appears to assert. Rather, a person of ordinary skill in the art would have understood Graff '210 to have described plasma treatment of inorganic layers to make structural modifications and certain types of chemical modifications. Such chemical modifications are neither explicit nor implicit disclosure that Graff '210 described or made obvious the use of plasma treatment of a barrier layer such that the barrier layer comprises a second surface with a material different from a first surface.

None of Graff '067 or Komada is asserted to remedy these deficiencies. For at least these reasons, claims 1-3, 6, 7, 10-15, 17-31 are patentable over the cited art.

Accordingly, the Applicants submit that the rejections of independent claim 1 and the claims that depend directly and indirectly therefrom are improper. The Applicants respectfully request that the claims be allowed. Please apply any necessary charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 12406-0083001.

Respectfully submitted,

Date: June 10, 2011

  
\_\_\_\_\_  
John Paul Mello  
Reg. No. 61,400

Customer Number 26181  
Fish & Richardson P.C.  
Telephone: (617) 542-5070  
Facsimile: (877) 769-7945

22596322.doc

<sup>17</sup> Office Action of March 10, 2011 at 4 (citing Graff '210 at ¶[0082]).

<sup>18</sup> See, e.g., Graff '210 at ¶[0082].